To: Butler, Barbara[Butler.Barbara@epa.gov]
From: Gilliland, Alice
Sent: Tue 8/11/2015 6:13:39 PM
Subject: RE: Sites I was talking about

Thanks, Barb! Very useful…

From: Butler, Barbara
Sent: Tuesday, August 11, 2015 8:55 AM
To: Gilliland, Alice
Subject: Sites I was talking about

Hi Alice,

Here are the websites I was talking about yesterday, as well as a few that I found last evening when looking for some further information.

This is the article that gives the **OSC's description** of what happened: http://www.durangoherald.com/article/20150806/NEWS01/150809720/Plans-to-plug-the-Gold-King-backfire-

Interestingly, no other articles I saw gave the OSC's accounting of events.

This is the EPA site that gives the background on what happened: http://www2.epa.gov/region8/gold-king-mine-release-emergency-response. And this site is the factsheet for the work they're planning at the other 2 mines that led to this one needing to be worked on. http://www2.epa.gov/sites/production/files/2015-06/documents/upper-animas-red-and-bonita-bulkhead-fact-sheet-5-22-2015.pdf

This article points out that "water has a habit of finding its way downstream, and plugging one mine often means it simply leaks from others, so the agency had to excavate and stabilize the Gold King mine upstream" and "The water that had accumulated in the mine's long-abandoned tunnels went tumbling into Cement Creek".

Also, ""It was known that there was a pool of water back in the mine, and EPA had a plan to remove that water and treat it, you know, slowly, Peter Butler, who serves as a co-coordinator of the stakeholders group, told KUNC. "But things didn't go quite the way they planned and there was a lot more water in there than they thought, and it just kind of burst out of the mine."" : http://www.washingtonpost.com/news/morning-mix/wp/2015/08/10/what-the-epa-was-doing-when-it-sent-yellow-sludge-spilling-into-a-colorado-creek/

This article points out that the river had issues before this incident and that it isn't clear how much additional damage the blowout has caused: http://www.vox.com/2015/8/10/9126853/epa-mine-spill-animas

This article points out that the water was being held behind unconsolidated debris (*which would eventually blow out if there were sufficient water pressure behind it*): http://www.denverpost.com/news/ci_28595759/animas-river-contaminated-by-1-million-gallons-contaminated They also say that EPA backfilled the portal last year after they suspended work, which could mean the water that was kept back would have flowed out over the time from then to now and been the 5 ft of water they expected mentioned in another article above.

Lastly: https://www.hcn.org/articles/when-our-river-turned-orange-animas-river-spill

I found this last night. It is well-written and less dramatic than some others; it states that the blowout might have happened anyway. Which, with the water being trapped, I too would expect. The Sunnyside Gold Corp plugged three places in the American Tunnel, which caused water to back up into the Red and Bonita mines. Those are the mines that EPA was going to plug, but wanted to stabilize the Gold King first, in case plugging those caused issues with it. They could monitor it and have means to remove the water from the other mines if that did happen. It appears these are all very interconnected.

I also found some news on concentrations of metals and effects on biota placed in-stream: http://www.denverpost.com/environment/ci_28614946/epa-taking-damage-claims-toxic-spill-animas-river

The concentrations of metals being high 6 hours after the blowout, but fish doing okay further downstream later on, seems reasonable - chemically. The video showing the

black-colored water indicates that it was anaerobic and contained sulfide precipitates. Those would oxidize and dissolve. Then, the iron would form ferric oxyhydroxides (HFO) and many metals (e.g., As, Cd, Cu, Zn) are known to co-precipitate and/or adsorb onto HFO. Cd and Zn are not as stable as the Cu and As associated with HFO (due to the actual binding type - electrostatic versus chemical bonding) and they aren't always as highly sequestered (e.g., maybe 50-75% versus the Cu being more like 60-90% or more). So, further downstream, the metals are likely to be more associated with the particulate phase and not dissolved; dissolved forms are the ones that are toxic to fish. The precipitates, however, are harmful to benthos if/when they settle on the streambed and sometimes can settle on gills of fish, but I think that's partly controlled by the velocity of the water.

http://epaosc.org/site/doc_list.aspx?site_id=11082 – this is the publicly-accessible OSC website where the currently available preliminary data and report is located.

Cheers,

Barb